Classifying Matter

The states o

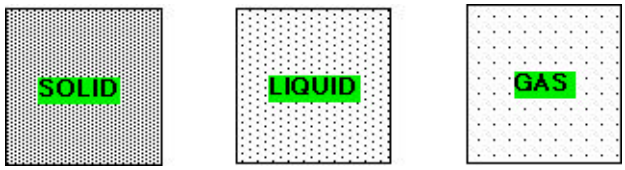
Wyoming, Utah, California, and Delaware. No really, they are: Solid, Liquid, Gas, and Plasma. Plasma is rarely found on earth, but it is very common in the universe (most stars are made of plasma). We will focus on the other 3 states of matter which are more commonly found on the earth.

Matter is made up of particles. These particles have characteristics specific to each of the individual states of matter. We can look at how the particles move, their proximity to each other and the shape(s) they can take.

STATES OF MATTER

STATE	MOVEMENT	PROXIMITY	SHAPE/VOLUME
SOLID	Very little; slow	Very tightly packed	Definite shape and volume
LIQUID	Free to move; faster	Close together	No definite shape; definite volume
GAS	Very fast	Very far apart	No definite shape or volume; fills container

ARRANGEMENT OF PARTICLES



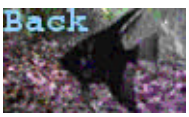
As the temperature of matter increases, particles move faster because they have more energy. In a solid, particles have less energy, are tightly packed together (dense) and do not move very much. Solids have a definite shape and volume. In a liquid, particles have more energy, are less tightly packed (less dense), and can move freely. Liquids have definite volume but no definite shape (instead, they take on the shape of the container). The particles in a gas have the most energy and are free to move around and so spread out rapidly. Gases do not have a definite shape or volume and expand to fill the entire container. Thus, as the temperature of matter increases, its density decreases (particles get farther apart).

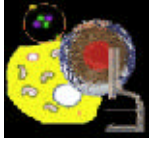
DISCUSSION QUESTIONS

- Classify the following forms of water as to whether each is a solid, liquid, or gas.
  - Water vapor or steam = ?
  - Water (e.g. in a pond or lake) = ?
  - Ice = ?
  - Answers: Water vapor or steam = gas
  - Water (e.g. in a pond or lake) = liquid
  - Ice = solid
- Explain how water particles (molecules) behave in each of the three states of matter - solid (ice), liquid (water), and gas (water vapor or steam).
  - Be sure to explain how the water particles move, their proximity to each other, and the shape/volume of the water.
  - Compare your answers to the chart below.

STATES OF WATER

Substance	State	Movement	Proximity	Shape/Volume
ice	solid	very slow	tightly packed	definite shape/volume
water	liquid	little faster	close together	no definite shape; definite volume
steam	gas	very fast	very far apart	no definite shape or volume





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